Amendments to the Claims

Following is a complete set of claims as amended with this Response. This complete set of claims excludes cancelled claims 38 and 47-50 and includes amended claims 32, 39, and 43.

1. (Previously Presented) An implantable cardiac rhythm device comprising:

a sensing circuit configured to sense physiological cardiac events;

a pulse generator configured to deliver electrical stimulation energy to selected cardiac tissue upon the sensing of selected cardiac events, the pulse generator having storage capacitors that store the stimulation energy;

a Lithium Pentoxide (LP) battery coupled to the storage capacitors, the LP battery providing a charging current to charge the storage capacitors to preselected energy level;

a supply battery, switchably connected in parallel to the LP battery, having characteristics that enable the supply battery to recharge the LP battery;

a recharging circuit coupled to the LP battery and configured to deliver recharging current to the LP battery; and

a controller programmed to enable the supply battery to recharge the LP battery when voltage across the LP battery falls below a predetermined minimum value.

2. (Original) The device of claim 1, wherein the LP battery is a Lithium Silver Vanadium Oxide (SVO) battery.

3. (Original) The device of claim 1, wherein the LP battery is recharged upon the detection of a predetermined number of deliveries of stimulation energy.

4. (Previously Presented) The device of claim 1, further comprising a LP battery voltage detector, operative to cause the LP battery to be recharged when the LP battery voltage is detected as being below the predetermined minimum value.

5. (Original) The device of claim 1, further comprising a charging time interval detector configured to monitor the charging time interval required to charge the storage capacitor to the preselected energy level and operative to cause the LP battery to be recharged when the charging time interval is detected to exceed a preselected value.

6. (Original) The device of claim 1, wherein the LP battery has a maximum energy capacity and wherein the LP battery is recharged at a rate less than a predetermined maximum charging rate to prevent LP battery degradation.

7. (Cancelled)

8. (Cancelled)

9. (Withdrawn) The device of claim 1, wherein the recharging circuit includes a receiver coil adapted for magnetic coupling to an external transmitter coil, wherein the LP battery is recharged as a function of the energy transmitted by the external transmitter coil.

10. (Cancelled)

11. (Previously Presented) The device of claim 1, wherein the LP battery has a stored energy density and the supply battery has a stored energy density greater than that of the LP battery.

12. (Original) The device of claim 11, wherein the supply battery comprises a relatively high energy density battery.

13. (Original) The device of claim 11, wherein the supply battery comprises Lithium Carbon Monofluoride (CFx).

14-28. (Cancelled)

29. (Previously Presented) An implantable cardiac rhythm management device comprising:

a pulse generator adaptively configured to generate electric shocks for delivery to a patient's heart comprising:

at least one output capacitor;

charging circuitry capable of charging the at least one capacitor to produce high voltage shocks for delivery to a patient's heart;

a first battery switchably coupled to the charging circuitry, having the characteristic of a high current flow rate to fast charge the at least one capacitor;

a second battery, switchably connected in parallel to the first battery, having characteristics that enable the second battery to recharge the first battery;

a detector, coupled to the charging circuitry, that detects when the recharging current is above a predetermined threshold indicative of abnormal recharging of the first battery; and

a controller programmed to switchably enable the charging circuitry to produce the high voltage shocks, and to disable the second battery whenever an abnormal recharging current is detected;

wherein the controller is further programmed to enable the second battery to recharge the first battery when the voltage across the first battery falls below a predetermined minimum value.

30. (Previously Presented) The device of claim 29 wherein the first battery has a battery end of life and the controller is programmed to enable the second battery to recharge the first battery prior to reaching the end of life thereof.

31. (Previously Presented) The device of claim 29 wherein the first battery charges the at least one capacitor in a capacitor charge cycle and wherein the controller is programmed to recharge the first battery upon the occurrence of a predetermined number of capacitor charge cycles.

32. (Currently Amended) An implantable cardiac rhythm management device comprising:

a pulse generator adaptively configured to generate electric shocks for delivery to a patient's heart comprising:

at least one output capacitor;

charging circuitry capable of charging the at least one capacitor to produce high voltage shocks for delivery to a patient's heart;

a first battery switchably coupled to the charging circuitry, having the characteristic of a high current flow rate to fast charge the at least one capacitor;

a second battery, switchably connected in parallel to the first battery, having characteristics that enable the second battery to recharge the first battery;

a detector, coupled to the charging circuitry, that detects when the recharging current is above a predetermined threshold indicative of abnormal recharging of the first battery; and

a controller programmed to switchably enable the charging circuitry to produce the high voltage shocks, and to disable the second battery whenever an abnormal recharging current is detected;

wherein ~~the~~ a capacitor charge cycle defines a charge cycle time, and wherein the controller is programmed to recharge the first battery when a the charge cycle time exceeds a preselected value.

33. (Previously Presented) The device of claim 29 wherein the first battery comprises a Lithium Pentoxide cell.

34. (Original) The device of claim 33 wherein the Lithium Pentoxide cell comprises a Lithium Silver Vanadium Oxide (SVO) cell.

35. (Previously Presented) The device of claim 29 wherein the second battery comprises a Lithium Carbon Monofluoride (CFx) cell.

36. (Previously Presented) An implantable cardiac rhythm management device comprising:

a pulse generator adaptively configured to generate electric shocks for delivery to a patient's heart comprising:

at least one output capacitor;

charging circuitry capable of charging the at least one capacitor to produce high voltage shocks for delivery to a patient's heart;

a first battery switchably coupled to the charging circuitry, having the characteristic of a high current flow rate to fast charge the at least one capacitor;

a second battery, switchably connected in parallel to the first battery, having characteristics that enable the second battery to recharge the first battery;

a detector, coupled to the charging circuitry, that detects when the recharging current is above a predetermined threshold indicative of abnormal recharging of the first battery; and

a controller programmed to switchably enable the charging circuitry to produce the high voltage shocks, and to disable the second battery whenever an abnormal recharging current is detected;

wherein the controller is programmed to periodically recharge the first battery independent of the number of occurrences of the delivery of high voltage shocks.

37. (Previously Presented) An implantable cardiac rhythm device comprising:

a sensing circuit configured to sense physiological cardiac events;

a pulse generator configured to deliver electrical stimulation energy to selected cardiac tissue upon the sensing of selected cardiac events, the pulse generator having storage capacitors that store the stimulation energy;

a Lithium Pentoxide (LP) battery coupled to the storage capacitors, the LP battery providing a charging current to charge the storage capacitors to preselected energy level;

a supply battery, switchably connected in parallel to the LP battery, having characteristics that enable the supply battery to recharge the LP battery; and

a recharging circuit coupled to the LP battery and configured to deliver recharging current to the LP battery;

wherein a capacitor charge cycle defines a charge cycle time, and wherein the recharging circuit recharges the LP battery when a charge cycle time exceeds a preselected value.

38. (Cancelled)

39. (Currently Amended) A method to deliver stimulation energy to selected cardiac tissue with an implantable cardiac stimulation device, comprising:

sensing physiological cardiac events;

disposing a Lithium Pentoxide (LP) battery within the implantable cardiac stimulation device;

charging storage capacitors with ~~a Lithium Pentoxide (LP)~~ the LP battery, the storage capacitors storing electrical stimulation energy;

delivering the electrical stimulation energy to selected cardiac tissue upon the sensing of physiological cardiac events; ~~and~~

disposing a supply battery within the implantable cardiac stimulation device;

switchably connecting ~~a~~ the supply battery in parallel to the LP battery to enable the supply battery to recharge the LP battery when voltage across the LP battery falls below a predetermined minimum value;

detecting when a recharging current is above a predetermined threshold indicative of abnormal recharging of the LP battery; and

disabling the supply battery whenever an abnormal recharging current is detected.

40. (Previously Presented) The method of claim 39 wherein the LP battery is a Lithium Silver Vanadium Oxide (SVO) battery.

41. (Previously Presented) The method of claim 39 wherein the LP battery has a stored energy density and the supply battery has a stored energy density greater than that of the LP battery.

42. (Previously Presented) The method of claim 39 wherein the supply battery comprises Lithium Carbon Monofluoride (CFx).

43. (Currently Amended) A method to deliver stimulation energy to selected cardiac tissue with an implantable cardiac stimulation device, comprising:

sensing physiological cardiac events;

disposing a Lithium Pentoxide (LP) battery within the implantable cardiac stimulation device;

charging a storage capacitor with ~~a Lithium Pentoxide (LP)~~ the LP battery to store electrical stimulation energy, the LP battery charging the storage capacitor in a capacitor charge cycle, the capacitor charge cycle defining a charge cycle time;

delivering the electrical stimulation energy to selected cardiac tissue upon the sensing of physiological cardiac events; ~~and~~

disposing a supply battery within the implantable cardiac stimulation device; and

switchably connecting a the supply battery in parallel to the LP battery to enable the supply battery to recharge the LP battery when the charge cycle time exceeds a preselected value.

44. (Previously Presented) The method of claim 43 wherein the LP battery is a Lithium Silver Vanadium Oxide (SVO) battery.

45. (Previously Presented) The method of claim 43 wherein the LP battery has a stored energy density and the supply battery has a stored energy density greater than that of the LP battery.

46. (Previously Presented) The method of claim 43 wherein the supply battery comprises Lithium Carbon Monofluoride (CFx).

47. (Cancelled)

48. (Cancelled)

49. (Cancelled)

50. (Cancelled)